

tigers taken, we presume, in the Zoological Gardens; several beautiful views taken of Siam, including a group of Laotian huts. There are also several specimens of new apparatus used in photography.

AN important innovation has been made in all the French colleges by M. Ferry. Any pupil wishing to be promoted to a superior class is obliged to pass an examination. The Government is asking important credits for the rebuilding of the principal colleges of Paris and the construction of new colleges outside of the fortifications.

Education is the title of a new international bi-monthly magazine, devoted to the science, the art, the philosophy, and the history of education. It is published at Boston, Mass., and by Trübner and Co., London.

A USEFUL exhibition is being held in Glasgow of apparatus for the utilisation of gas, electricity, oils, &c., and of hydraulic, architectural, mining, and sanitary appliances.

UNDER the name of Tong-pang-chong a Chinese remedy for skin diseases was brought to European notice some two years since. The material as brought to this country appeared like fragments of a woody root, and it was said to be produced by a plant growing in Siam, from whence it is sent to China, where its use had become quite general. From subsequent information received from China and from examination and comparison of specimens sent to this country with those already contained in the Kew Museum, there seemed but little doubt that the plant which produced the Tong-pang-chong of the Chinese was *Rhinacanthus communis*, an acanthaceous plant. A good deal of interest was attached to this remedy when it first came to notice, since which time nothing has been heard of it until within the last few weeks, when some of the material has been received in this country, and is now in the possession of Messrs. Christy and Co. of Fenchurch Street. Whether this consignment will prove to be identical with *Rhinacanthus communis*, and so prove the accuracy of the preliminary determination which was made from scant materials, or whether it will turn out to be produced by a distinct plant will no doubt, shortly be seen. The remedy is referred to in the *Kew Garden Report* for 1877, p. 41.

HERR TORNÖE has published in the *Sitzungsberichte der k. Akademie der Wissenschaft zu Wien* (81, 924) a detailed account of the estimations of salt in the Norwegian Sea, conducted by him during the late Norwegian North Sea Expedition. The paper is a valuable contribution to the physical history of the North Sea.

THE monster python which is kept alive in the Antwerp Museum having had inflammation of the jaw, a Belgian doctor volunteered to enter its cage in order to cure it; but the brute attempted to suffocate the poor doctor, who was glad to escape with his life.

THE Queenwood College Mutual Improvement Society seems to be doing much to encourage the study of natural science among its members. The Report of the Committee for the last summer term speaks highly of the various collections made for the exhibition; several useful papers were read and interesting excursions made.

IN the report of the awards made by the different juries of the Exhibition of Agriculture and Insectology at Paris it is stated that a public company has been formed in Spain for the rearing of the silkworm fed on the oak, and the number of cocoons to be collected this year will probably amount to no less than three millions. A special machine for weaving this new silk has worked during the whole time that the Exhibition has been open. A medal was awarded to an exhibitor for a lamp specially arranged to catch insects. It is suggested in the

report that the same experiment should be tried by electric light, and a recent instance has been quoted to prove that it would be really successful. A certain number of electric lights, for ordinary illuminating purposes, were used this summer in the gardens of the Meaux Exhibition, in the vicinity of the Forest of Fontainebleau. No arrangements were made for catching the insects, and they fell round the lamps, except a few that got admittance through the holes of the regulator. The number of the latter was so large that two of these lamps placed at a coffee stall in the open air had to be removed, all the consumers being covered by moths of every description.

THE piscicultural experiments at Ercildoune, Victoria, Australia, have been unusually successful; 9,100 ova were collected, of which 2,000 were salmon trout.

THE additions to the Zoological Society's Gardens during the past week include a Purple-faced Monkey (*Semnopithecus leucoprymnus*) from Ceylon, presented by Mr. Wm. Collingwood; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. Henry Thimbleby; a White-cheeked Capuchin (*Cebus lunatus*) from Brazil, presented by Mr. Henry Ch. Marckman de Lichtabell; two Common Cranes (*Grus cinerea*), European, presented by Mr. Norman W. Shairp; a Rose Hill Parrakeet (*Platycercus eximius*) from New South Wales, presented by Mr. Charles Porter; a Common Chameleon (*Chameleon vulgaris*) from North Africa, presented by Mr. Percy Day; a West African Python (*Python sebae*) from West Africa, presented by Dr. F. Speer; a Bless-bok (*Alcelaphus albifrons*) from South Africa, a Prince Albert's Curassow (*Crax alberti*) from Columbia, deposited; a Sulphur-breasted Toucan (*Ramphastos carinatus*) from Mexico, purchased.

OUR ASTRONOMICAL COLUMN

THE BINARY STAR α CENTAURI.—Mr. W. L. Elkin, who has been recently a student at the University of Strassburg, has given, in a dissertation for the degree of Doctor, a new determination of the orbit of this remarkable star, in which he has had the advantage of a fine series of measures executed by Sir T. Maclear, Mr. W. Mann, and Mr. G. Maclear at the Royal Observatory, Cape of Good Hope, collected and forwarded to him by Mr. Gill. We subjoin his elements, which, though not considered definitive, yet appear to represent the whole course of micrometrical measures very satisfactorily. Mr. Gill's measures in 1877 seem to indicate well the position of the companion about its nearest approach to the principal star, which it was feared at one time there would be danger of losing at this passage of the periastrae. For the sake of comparison the provisional orbit deduced in 1879 by Dr. Doberck is annexed; the most noticeable difference is in the period of revolution.

	Elkin.	Doberck.
Passage of periastre ...	1875° 97'	1875° 12'
Node ...	25° 47'	25° 32'
Node to periastro on orbit.	54° 47'	45° 58'
Inclination ...	79° 32'	79° 24'
Excentricity ...	0° 5260	0° 5332
Semi-axis major ...	17° 50'	18° 45'
Revolution ...	77'42 years	88'536 years.

Mr. Elkin's orbit gives the following angles and distances:—

1880°	Position	185° 7'	Distance	4° 79"
1881°	"	192° 4'	"	6° 81"
1882°	"	196° 1'	"	8° 70"
1883°	"	198° 5'	"	10° 42"
1884°	"	200° 2'	"	11° 98"

For the absolute parallax of α_2 Centauri, he states that the series of 156 altitudes observed on the same days, directly and by reflection with the Cape circle in the years 1856-60, assigns $+0''798 \pm 0''068$; Moesta from observations at Santiago had found $0''88$. Although a large parallax, the largest perhaps yet detected, may still be attributed to this star, it appears to be Mr. Elkin's conclusion that it yet remains to be determined within very narrow limits. Probably Mr. Gill, with the aid of the heliometer, may in due course give a good account of it.

THE VARIABLE R HYDRAE.—Dr. Gould, at Cordoba, has given much attention to the changes in this variable star, respecting which Argelander remarked that so long as observations were confined to European latitudes little would probably be understood, and he has deduced a formula closely representing the observations, excepting one by Maraldi, about which there appears to be a large error. The earliest recorded observations of this celebrated variable Dr. Gould remarks were those of Hevelius in April, 1662, published in the scarce volume of the "Machina Cœlestis" in 1679. Montanari of Bologna comparing Bayer's Uranometry with the sky on April 15, 1670, remarked it as a star of the fourth magnitude, not entered upon the map, and notified it as a new object. Its variability was recognised by Maraldi at Paris in 1704, who watched it at intervals till 1712. There then appears to be a gap in the observations until we come to those of Pigott in 1784 and 1785. Argelander collected and discussed all the observations to the beginning of 1863, and deduced a formula which fairly represented the data since 1784. The length of the period is decreasing rapidly, amounting, as Dr. Gould says, to more than nine hours at each successive recurrence—a circumstance which impeded the determination of the number of periods elapsed between Montanari's observation in 1670 and the first maximum noted by Pigott. Twelve periods having elapsed since the latest maximum included in Argelander's investigation, present data allow of clearing up several doubtful points.

Dr. Gould finds that the number of periods between the maxima of 1670 and 1784 must have been eighty instead of eighty-four, as assumed by Argelander, and the number between the maxima of 1670 and 1704 must have been twenty-three instead of twenty-five. Assuming that Maraldi's second maximum is erroneously dated in 1708, instead of 1707, he finds that all existing observations except Maraldi's first, may be represented within quite tolerable limits, "by supposing a uniform diminution in the period, upon which are superposed variable terms, according to which a symmetric perturbation completes its cycle in seventy-two years," and the following formula is finally inferred. The days are counted from the beginning of the year 1875:—

$$T = 35^{\circ}6d. + 434^{\circ}445d. n - 0^{\circ}37974d. n^2 + 32^{\circ}0d. \sin(5^{\circ}n + 10^{\circ}) + 2^{\circ}6d. \sin(10^{\circ}n + 324^{\circ}) + 6^{\circ}8d. \sin(15^{\circ}n + 205^{\circ})$$

It will be found that the formula fixes the next maximum to January 18, 1881; Schmidt alone has observed the minima, which occur on the average at about 9-16ths of the interval between the maxima.

A NEW COMET.—On the evening of September 29 Dr. Ernst Hartwig of the Imperial Observatory, Strassburg, discovered a bright comet about 10° north of Arcturus, and having obtained observations on three consecutive nights, has calculated the following elements:—

Perihelion passage, September 6th 1852 M.T. at Berlin.

Longitude of perihelion	80° 6'
" ascending node	43° 32' 3"
Inclination of orbit	38° 48' 3"
Logarithm of perihelion distance	9.56450

Motion—retrograde.

Hence he finds, for Berlin midnight:—

R.A. h. m. s.	Decl. '	Log. distance from Earth. Sun.
Oct. 6 ... 16 7 40 ... +24 35' 5 ...	9° 8147	9° 9231
8 ... 16 29 22 ... 22 46' 2 ...	9° 8488	9° 9432
10 ... 16 47 18 ... 21 3' 5 ...	9° 8827	9° 9623
12 ... 17 2 15 ... 19 29' 6 ...	9° 9158	9° 9805
14 ... 17 14 51 ... +18 5' 0 ...	9° 9476	9° 9978

The intensity of light is rapidly diminishing, being on October 14 only one-sixth of that at the time of discovery.

The above orbit places the comet at 6 a.m. G.M.T. on September 12 near to Regulus, so that it is distinct from the object notified by Mr. Lewis Swift of Rochester, N.Y.

The comet was seen for a few seconds between clouds at the Royal Observatory, Greenwich, and at Mr. Barclay's observatory, Leyton, on the 5th, and is described by Mr. Talmage as "very bright," with a long tail."

CHEMICAL NOTES

IN connection with the subject of water of hydration the results of Van Bemmelen, described in the *Berliner Berichte*, are of interest. He has determined the quantities of water

parted with, and also taken up by various hydrated oxides under different conditions of temperature and humidity of surrounding atmosphere. The results afford another instance of the graduation of chemical into physical actions. The amount of water taken up varies but little, but the strength of the combination varies much. The formation of hydrates appears to be a function of molecular weight of the oxide and of the temperature.

Two papers of great importance by Thomsen have just appeared in the *Berliner Berichte*. Thomsen attempts to base a general theory of the structure of carbon compounds on thermal determinations. He does this by measuring (indirectly, of course) the heat of dissociation of the carbon molecule, and from this and other data, finding a thermal value for the combination of two carbon atoms, to form a gaseous compound, by four, three, two, or one "link." Hence he deduces a thermal value for each "link." General equations are given for calculating the heats of formation of various isomers, assuming a certain "linking" of the atoms for each. In cases where various "linkings" may be assumed, a determination of the heat of formation may determine which "linking," and therefore which structural formula, is the more probable.

IN a paper read before the Owens College Chemical Society Messrs. Bevan and Cross detail experiments on jute fibre, which lead them to regard the intercellular portion of this fibre as probably consisting of an aromatic compound of the quinone class, together with a substance allied to the carbohydrates, and somewhat of the nature of cellulose. The presence of this intercellular substance confers on jute the power of retaining various dye-stuffs. The authors also describe a method of separating cellulose from jute fibre, based on the action of chlorine or bromine, subsequent boiling with dilute caustic lye, and washing in acid. Jute fibre which has been acted on by chlorine is coloured deep magenta by immersion in a solution of sodium sulphite. The work of Messrs. Bevan and Cross promises results of considerable importance.

MR. O. HEHNER publishes in the *Analyst* the results of his determinations of phosphoric acid in potable waters. He concludes that the presence of more than 0.5 parts per million of P_2O_5 should be regarded with suspicion; also that absence of phosphates affords no positive proof of freedom from pollution.

IT is stated in the *Chemiker Zeitung* that if a solution of two parts of citric and one of molybdic acids be evaporated to dryness, heated to incipient fusion, and dissolved in 30 to 40 parts of water, a solution is obtained which imparts a blue colour to paper immersed in it, and dried at 100°. This paper is bleached by water, and may be used as a test for the presence of water in alcohol, ether, &c.

M. DE SCHULTER states in *Comptes rend.* that he has succeeded in preparing pellucid crystals of analcite by heating a solution of sodium silicate or caustic soda along with aluminous glass in sealed tubes to about 190°.

FROM analyses and determinations of specific heat of cerium tungstate, Cossa and Zecchini (*Gazzetta chim. Italiana* for July) think that the atomic weight of cerium is better represented by 92, the number formerly adopted, than by 138, which—or more probably 141—is generally regarded as correct. The data of the Italian observers are as follows:— $Ce_2(WO_4)_3$ ($Ce=92$) = 1026, $\times 0.0821$ (sp. heat found) = 84.2, atomic heat of $W = 6.4$, of $O = 4$; hence molecular heat of $(WO_4)_3 = 67.2$, but $84.2 - 67.2 = 17$, which $\div 2$ gives 8.5 as the atomic heat of cerium. $CeWO_4$ ($Ce = 92$) = 340, $\times 0.0821 = 27.9$; but $27.9 - 22.4$ (that is, molecular heat of WO_4) gives 5.5 as the atomic heat of cerium. The careful determinations of the specific heat of metallic cerium made by Hillebrand, and the general analogies of the cerium salts, must however be regarded as of more value in determining the atomic weight of this metal than a series of estimations of the specific heat of a compound containing oxygen, concerning the influence of which element on the specific heat of compounds thereof we have so little exact knowledge.

THERE has of late been a considerable amount of discussion as to the existence of pentathionic acid, $H_2S_5O_8$. In a recent paper in the *Journal* of the Chemical Society, Messrs. Takanatsu and Smith bring forward evidence which appears conclusively to prove that this acid does exist.

HELL has studied the action of bromine on acids of the acetic series, and in a paper in the *Berichte* he shows that the substitution of bromine for hydrogen proceeds slowly, until from